

MARSHALL STAR

Serving the Marshall Space Flight Center Community

Feb. 3, 2011

Final mission for space shuttle Discovery

Space shuttle Discovery arrived at the launch pad at Kennedy Space Center, Fla., on Feb. 1, completing its seven-hour trip atop the crawler-transporter.

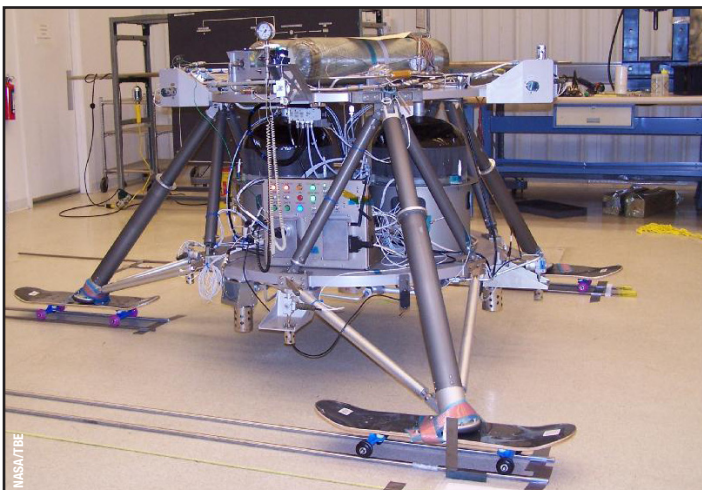
Technicians will prepare the shuttle for its last lift off on the STS-133 mission to the International Space Station. The launch window opens Feb. 24.

Commander Steve Lindsey and his crew of five astronauts will deliver the Permanent Multipurpose Module, a large, reusable pressurized element originally used to ferry cargo back and forth to the space station.

At 21 feet long and 15 feet in diameter, it was formerly known as the Leonardo Multipurpose Logistics Module. Engineers at the Marshall Space Flight Center were responsible for developing and integrating the modifications to convert Leonardo to a permanent fixture for the orbiting facility.



Discovery makes its nighttime trip to the launch pad at Kennedy Feb. 1.



The robotic lander prototype was placed on modified skateboards and a customized track system to control movement during final testing of the prototype's sensors, onboard computer and thrusters.

NASA's new lander prototype skates through integration and testing

By Kim Newton

NASA engineers successfully integrated and completed system testing on a new robotic lander recently at Teledyne Brown Engineering's facility in Huntsville in support of the Robotic Lunar Lander Project at the Marshall Space Flight Center.

The lander prototype was placed on modified skateboards and a customized track system as a low-cost solution to

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NASA scientists study more than rockets in 'Deep South'

By Kim Newton

A city that rarely sees snowfall, Huntsville was blanketed the evening of Jan. 9 under several inches of snow following a winter storm that also produced a rare "thundersnow" or lightning flashes. This unique weather event allowed scientists at the Marshall Space Flight Center and the University of Alabama in Huntsville the opportunity to assemble one of the most detailed snowfall datasets on record for the deep southern tier of the continental United States.

Scientists in Huntsville were eager to measure the snowstorm's effects since the city hadn't seen a storm of this magnitude since March 1993 when it received a record 7.3 inches of snowfall. As the flakes started to fall, researchers worked to deploy several advanced radars, a large collection of snow particle measurement instrumentation and a 3-D lightning location array to gather storm data.

Advanced instruments known as "dual-polarimetric" radars from UAHuntsville scanned the snow-producing clouds on that Sunday night and Monday morning, measuring precipitation contents and wind flow, while ground-based camera and laser imaging systems measured individual snowflake sizes, the rate of fall of the snowflakes and the amount of melted water associated with the snowfall.

Dr. Walt Petersen's "Disdrometer and Radar Observations of Precipitation" group at the Marshall Center and NASA's Global Precipitation Measurement – or GPM – mission provided a large cluster of precipitation measurement equipment currently managed at Marshall. They guided the Advanced Radar for Meteorological and Operational Research, also known as ARMOR, polarimetric radar operations as part of the study with UAHuntsville scientists.

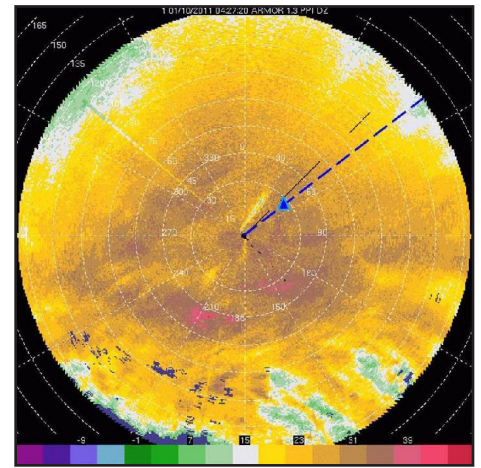
"NASA's GPM mission has invested significant resources in equipment that

can help us better determine what an orbiting, satellite-based remote sensor sees at the top of Earth's atmosphere when it is snowing or raining at the surface of the Earth," said Petersen. "The snowflakes and raindrops produced in clouds between the Earth's surface and the top of the atmosphere cause changes in the microwave radiation measured at the top of the atmosphere. These changes occur as a function of the cloud thickness, as well as precipitation type and shape, and are particularly sensitive to the presence of snowflakes or raindrops."

The snowstorm provided an excellent opportunity for Petersen's team to take detailed measurements of precipitation and use those observations as a type of database or model to simulate what the constellation of GPM satellites would see from space. By combining the observations at the ground with those of the polarimetric radar, Petersen's team expects to learn a great deal about the processes responsible for creating the snowfall, and more accurately measure the water content of the snow from space and the rate at which that snow-water equivalent accumulates on the ground.

"The snow rate accumulation is important for winter weather preparedness on Earth," said Petersen. "Several of the Southern states were criticized for their lack of planning. It would mean a great deal if we could predict the intensity of the storm to allow cities more opportunity to be ready for this type of once-in-a-decade weather event."

Petersen and his team worked in tandem with researchers and scientists from the Department of Atmospheric Science led by Professor Kevin Knupp at UAHuntsville. Knupp's team deployed the UAHuntsville mobile X-band radar, or MAX, and used it to scan over the top of the NASA GPM instruments at the National Space Science and Technology Center in Huntsville. By combining the radar



Snowfall echo observed by the ARMOR radar on Jan. 10.

measurements from at least two of the radars, Knupp's team hopes to relate the wind flow within the storm to the precipitation measurements taken by Petersen. Knupp noted that "the atmosphere was full of gravity waves," features in the atmosphere that produce rapid up and downward motions and enhance the rate at which snow falls.

"Our team feels lucky and even surprised to have been able to marshal our collective resources to sample such a unique event in this part of the United States," said Petersen. "A team of scientists, including Dr. Lawrence Carey, Patrick Gatlin and Matt Wingo of UAHuntsville, just finished making similar measurements in Finland, yet here we are doing something similar in Huntsville, of all places."

The combined research team was able to collect the most detailed observations of thundersnow – including the actual propagation path of individual lightning flashes – ever collected in the Southeastern United States. These observations will help the NASA and UAHuntsville teams determine how electrical processes in thunderstorms function by comparing the observations to those collected in frequently observed summer thunderstorms.

The ARMOR radar and Northern Alabama lightning-mapping array

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The space shuttle era – 1981-2011

By Sanda Martel

STS-1 lifted off April 12, 1981, marking the first launch of a reusable spacecraft. Space shuttles have repeatedly carried people into orbit; launched, recovered and repaired satellites; conducted cutting-edge research, and built the largest structure in space, the International Space Station.

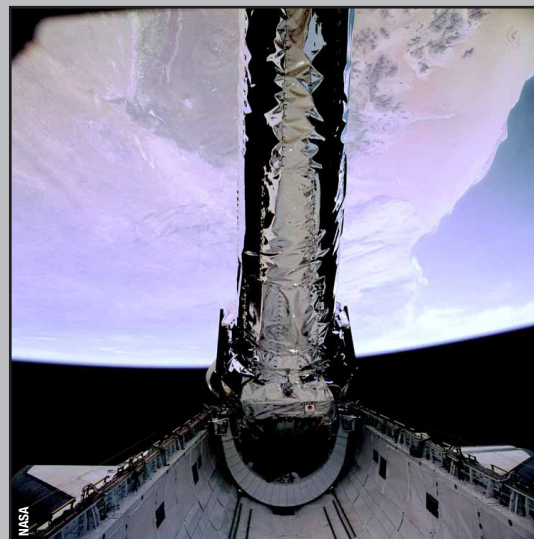
As the program nears its 30th anniversary, the Marshall Star will feature images and highlights from past shuttle missions.

Chandra X-Ray Observatory

The Chandra X-Ray Observatory was launched on space shuttle Columbia July 22, 1999, from Kennedy Space Center, Fla. STS-93 was the first mission in space shuttle history to be commanded by a woman, astronaut Eileen Collins.

The Chandra X-ray Observatory is part of NASA's fleet of "Great Observatories," along with the Hubble Space Telescope, the Spitzer Space Telescope and the now-deorbited Compton Gamma Ray Observatory. Chandra allows scientists from around the world to obtain X-ray images of exotic environments to help understand the structure and evolution of the universe. The telescope has enabled scientists to study exotic phenomena such as exploding stars, quasars and black holes. The Chandra X-ray Observatory Program is managed by Marshall Space Flight Center for the Science Mission Directorate at NASA Headquarters in Washington.

Martel, an AI Signal employee, supports the Office of Strategic Analysis and Communications.



The Chandra X-Ray Observatory being deployed from space shuttle Columbia's payload bay.

Lander *Continued from page 1*

control movement during final testing of the prototype's sensors, onboard computer and thrusters. The functional test focused on ensuring that all system components work seamlessly to sense, communicate and command the lander's movements.

The prototype was transported to the U.S. Army Redstone Arsenal Test Center in Huntsville to begin strap-down testing, which will lead to free-flying tests later this year.

The lander prototype will aid NASA's development of a new

generation of small, smart, versatile landers for airless bodies such as the moon and asteroids. The lander's design is based on cutting-edge technology, which allows precision landing in high-risk, but high-priority areas, enabling NASA to achieve scientific and exploration goals in previously unexplored locations.

Development of the lander prototype is a cooperative endeavor led by the Robotic Lunar Lander Development Project at the Marshall Center; Johns Hopkins Applied Physics Laboratory

in Laurel, Md.; and the Von Braun Center for Science and Innovation, which includes the Science Applications International Corp., Dynetics Corp., Teledyne Brown Engineering Inc., and Millennium Engineering and Integration Co., all of Huntsville.

For more information on the Robotic Lunar Lander Development Project, please visit <http://www.nasa.gov/roboticlander>.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

Snow *Continued from page 2*

projects represent collaborative efforts between the Marshall Center and team members, and partners from UAHuntsville. These efforts are funded in part by the National Oceanic and Atmospheric Administration/

NASA Geostationary Operational Environmental Satellite-R Series satellite program, NASA's Tropical Rainfall Measuring Mission and Global Precipitation Measurement Missions, all managed by NASA's Goddard Space

Flight Center in Greenbelt, Md., and NASA's Earth Science Division in Washington.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

Find center events, announcements and more at the MSFC Happenings page on ExplorNet

By Amie Cotton

Marshall Space Flight Center team members have a new place for checking out the latest announcements and events around the center: the MSFC Happenings page on ExplorNet.

The MSFC Happenings page will serve as the employee communications Web page on ExplorNet and house center announcements, Marshall's calendar of events, MSFC News & Notes and a question of the week. The page is located at https://explornet.msfc.nasa.gov/community/msfc/msfc_happenings.

"We're excited to offer this employee communications tool to the Marshall team," said Steve Durham, deputy of the Public & Employee Communications Office in the Office of Strategic Analysis & Communications. "ExplorNet allows for more functionality with Web pages, and instead of static pages like those on Inside Marshall, team members can respond, ask questions and even post their own events and announcements. It allows for two-way communications and a more open dialogue."

Durham noted center announcements and events will continue to be found on Marshall's intranet site, Inside Marshall. The links will now take employees to ExplorNet pages for added capabilities.

On the MSFC Happenings page, team members will find center announcements and a calendar of events. They can click on an icon and post their own center-related announcement or event or send their information to the Public & Employee Communications Office via e-mail at MSFC-INTERCOM@mail.nasa.gov for posting on the MSFC Happenings page as official MSFC announcements. For instructions on posting a center announcement, visit <http://inside.msfc.nasa.gov/howto/communicate.html>.

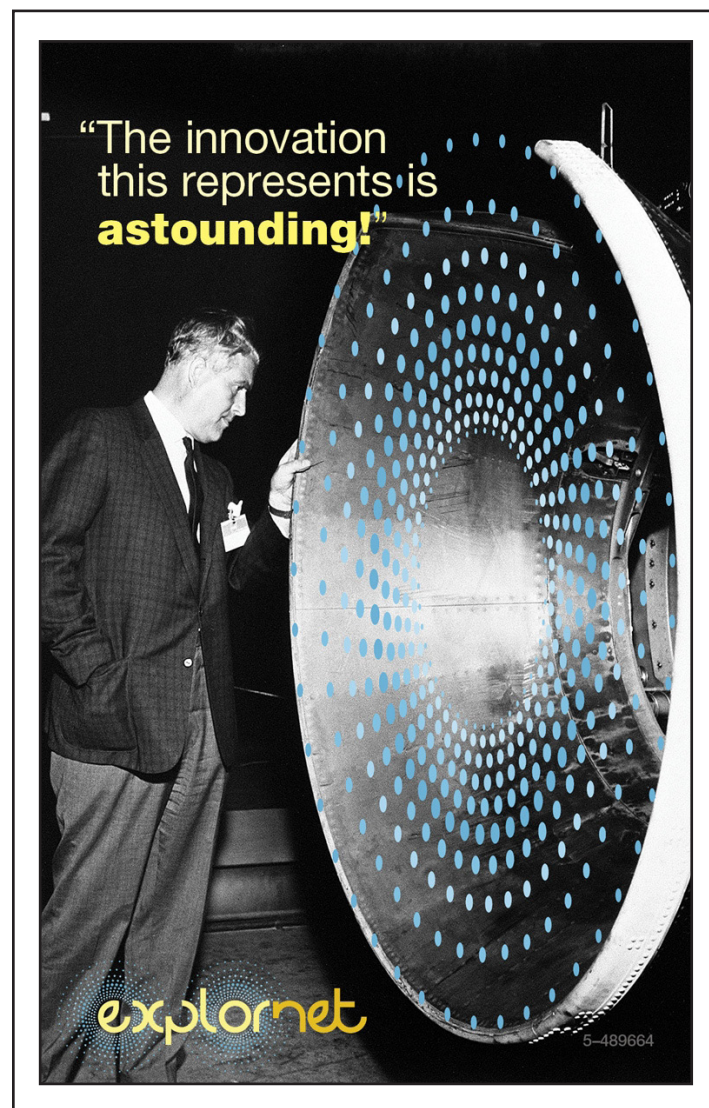
MSFC News & Notes will serve as a place for programs, projects, teams and employees to post what they are working on at the center. "It is a place to collaborate, share

information and talk about what is going on at the center," said Durham.

The question of the week is a question posed to all Marshall team members about the center as a whole, and to get the center talking. Employees are encouraged to participate and offer their opinions and feedback.

"Our goal is offer team members an innovative means to use the center's new social media tool to engage in communications about the center, learn more about what is going on and share information that can be useful to other team members," said Durham.

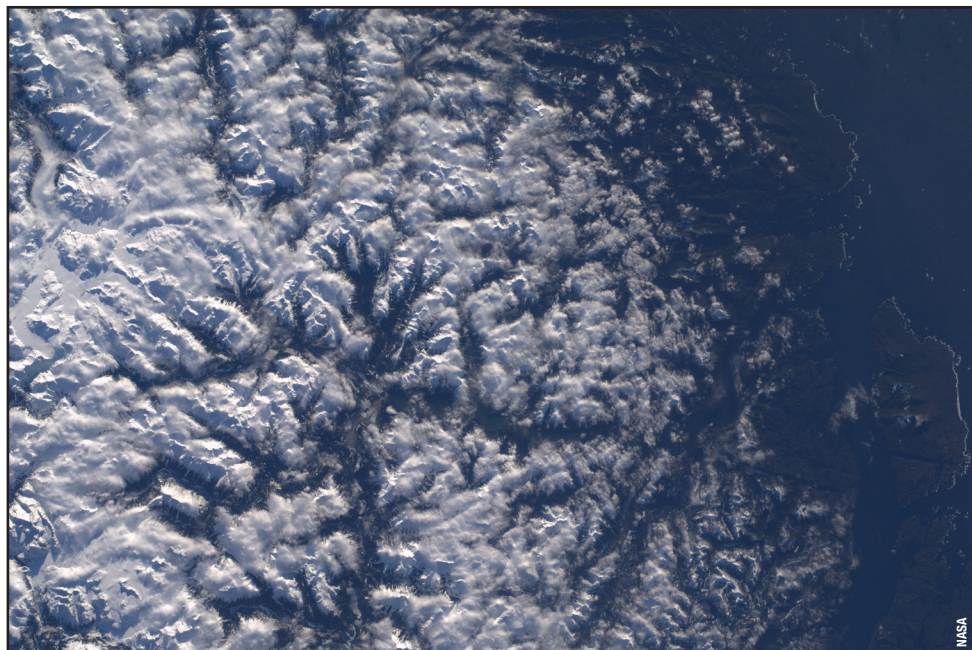
Cotton, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.



WOLF captures first payload image from station

This photo of British Columbia, Canada, just north of Vancouver Island, is the first payload image captured from the Window Observational Research Facility, or WOLF, aboard the International Space Station. The WOLF provides a facility by which crew members remotely operated payloads and can perform Earth and space science research, including hand-held photography, using the Destiny Laboratory science window. The window has the highest quality optics ever flown on a human-occupied spacecraft.

Taken Jan. 17, this image was commanded by the EarthKAM, or Earth Knowledge Acquired by Middle School Students, camera mounted inside WOLF. EarthKAM is a science experiment for middle school students around the world to set a camera to a specific target on Earth to photograph and study in the classroom.



Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Marshall Star Ad Form." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, Feb. 10, is 4:30 p.m. Thursday, Feb. 3.

Miscellaneous

Verizon Samsung Reality U820 piano black 3G phone, touch-screen, slide out, camera/camcorder. 256-684-1143

Diamond ring, round center, two ovals, total 1.58 carats, \$2,900. 256-658-3960

Sofa/loveseat, \$450; entertainment center, \$300, photos at <http://home.mchsi.com/~jscottm/furniture.htm>. 256-828-9651

Authentic Gucci mini wallet for women, \$150 obo; 1967 Harley Davidson Sprint frame, \$100 obo. 256-509-0120

Two goats, one Nanny and one young Billy, \$75 each. 931-425-0830

Two piece solid oak hutch, two glass doors at top, light, 41"Wx18"Dx76"H. 256-881-0457

Steelchase leather sofa, love seat, chair, ottoman, sell as set

or separate. 256-722-5282 or 256-656-8297

42-inch Panasonic HD Plasma TV, reasonable price. 256-227-0542

Solid cherry armoire, hangs clothes, includes two drawers. 256-227-0542

Two men's ski jackets, large, \$50 each; men's shell jacket, medium, \$15. 256-882-3983

Bowflex Extreme2, \$400. 256-612-7729

Raleigh road bicycle, new tires, wide soft seat, straight handlebars, fits 5'2" to 5'7", \$150. 256-656-0571

Marshall Stars, almost complete collection from 1964 through 2009, plus many NASA activities, \$50. 256-881-5860

Panasonic Sa-HT920 home entertainment system with five-disc DVD changer, \$150. 256-656-2380

Firewood, mixed wood or solid, seasoned and new, will deliver and stack. 256-468-8906

Glock Model 26, Crimson Trace; Ithaca LeFever 12 gauge. 256-830-5663

2003 bisque "over the stove" microwave, \$50. 256-883-8483

Nine-foot pre-lit Christmas tree, \$150; JVC miniDV camcorder, \$75. 256-337-7943

Stairlift, ACORN Model 120 Superglide, \$1,500. 256-655-5483

Large couch, \$100; GE microwave, \$20; Rock Band instrument set/game for Xbox360, \$60; pictures available. 256-684-1513

Sony PSP, six games, case, memory card, \$100. 256-655-6293

Vehicles

2007 Honda Civic, four door, auto, power windows, CD, MP3, 63k miles, \$12,000. 256-829-1296

2007 Chevy Corvette, Lemans blue, cashmere interior, six CD, both tops, 56k miles, \$28,900 obo. 256-777-5893

1998 Stingray RS180, fish/ski, new 140hp, vests and other new equipment, \$9,500 obo. 256-640-6427

1998 Volvo S70, automatic, \$2,700; 1-ton shop crane, \$125. 256-837-4136

1997 Nissan Pathfinder LE 4x4, leather, loaded, 189k miles, \$3,650 obo. 256-658-8241

Wanted

Students interested in obtaining beginner to advanced scuba diver certification. 256-651-9909

Electrical work to do, wiring houses, detached garage, yardlights, adding/removing lights, switches, plugs. 256-468-8906

Houses/offices to clean, available evenings and weekends. 256-777-8595 leave message

Cpap device. 256-527-8116

Free

Two adult terrier dogs, girl/boy, roughly 60 lbs each, fixed. 256-270-6041

We remember



Marshall Space Flight Center joined as a family during NASA's Day of Remembrance on Jan. 27 to honor the crews of Apollo 1 and space shuttles Challenger and Columbia, as well as other NASA team members who lost their lives supporting the agency's mission of exploration and discovery. Left, Chris Singer, deputy director of the Engineering Directorate, lights candles during the event at Morris Auditorium in Building 4200 in remembrance of the fallen.

Right, James Halsell, former NASA astronaut and now vice president of Safety & Mission Assurance for ATK – or Alliant Techsystems Inc. – Launch Systems in Huntsville, speaks about those fateful days when the nation mourned the loss of our crew members. This year marks the 25th anniversary of the Challenger accident of Jan. 28, 1986. The Day of Remembrance observance began in 2004, and is now observed each year on the last Thursday of January.



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